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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/689,114	10/12/2000	Hideo Shibahara	NEKW 17.876	6403

7590 05/18/2004

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New York, NY 10022

EXAMINER	
AKKAPEDDI, PRASAD R	
ART UNIT	**PAPER NUMBER**
2871	

DATE MAILED: 05/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	09/689,114	SHIBAHARA, HIDEO	
	Examiner	Art Unit	
	Prasad R Akkapeddi	2871	

-- The MAILING DATE of this communication appears on the c ver sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 February 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 October 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *02/12/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

2. The Examiner thanks the applicant for the explanation of the thicknesses of the various layers and the new matter rejection under 35 U.S.C. 132 is hereby withdrawn.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kishimoto et al. (Kishimoto) (U.S.Patent No. 6,281,960) in view of Murouchi (U.S.Patent No. 6,067,144).

As to claims 1,2 and 15: Kishimoto discloses a liquid crystal display panel (100) and a process for fabricating such panel, comprising a pair of substrate structures (20, 40) having plural pixels (22) where an image is produced, liquid crystal (54) filling a gap between the substrate structures of the pair and selectively making the pixels dark and bright for producing the image, and column spacers (108) formed on one of the substrate structures (40) and held in contact with the other of the substrate structures (20), (Figs. 1-7). Kishimoto in (col. 11, lines 23-26) discloses that the pixel size is about 320 X 320 micrometers and the size of the column spacers (108) is about 20 X 30 micrometers (Fig. 7). Hence the ratio of the total contact area between the column spacers and the other of the substrate structures to the total area occupied by the plural pixels being 0.06 % as disclosed by Kishimoto. Kishimoto also discloses a process of fabricating such panel (col. 13 and 14), as recited in claim 15 and the column spacers are respectively associated with the pixels (Fig. 7), as recited in claim 2.

Note that the range for the contact area as disclosed by Kishimoto is larger than the range of about 0.05 % to 0.015 % (asserted in claims 1 and 15). However, the recited range in the instant claim 1 is considered to be within the optimization range. Therefore, the range in claims 1 and 15 would have at least been obvious. See **In re Malagari**, 499 F.2d 197, 182 USPQ 549 (CCPA 1974).

As to the newly recited limitation in the amended claims 1 and 15 "at least one of said column spacers being formed between adjacent pixels of said pixels", Kishimoto does teach that the column spacers (polymer walls) 12b and 12b' having different heights are formed at the periphery of corresponding pixels (col. 10, lines 14-17 and 33-34). Kishimoto's pixel area consists of R,G,B sub-pixels. Hence the pixel region is in between the walls 12b' and 12b. Hence being at the periphery of the corresponding pixels as taught by Kishimoto, the column spacers are adjacent to the pixel area. Applicant's arguments on page 12, lines 9-13, appear to agree with the Examiner's earlier reasoning.

In addition, Murouchi (earlier cited prior art) clearly teaches that the column spacers 5a and 5b are formed between adjacent pixels (3a, 3b and 3c) of the plural pixels.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the Kishimoto LCD device with a ratio as recited in order to enhance the display area by reducing either the number of spacers or by reducing the contact ratio of the spacers to enhance the viewing angle as well as having excellent display quality (col. 5, lines 61-65) and further modify the device using the teachings of Murouchi as to the arrangement of the column spacers between adjacent pixels to provide a rigid liquid crystal display cell with superior productivity and durability (col. 2, lines 13-15)..

As to claims 10-11: Kishimoto discloses that each of the column spacers (108) is associated with pixels selected from plural pixels (22). However, Kishimoto does not disclose that the column spacers are classified into two groups one of which is taller than the other.

Murouchi on the other hand, in disclosing LCD cell discloses two supporting members (4 and 5) having column shapes with different heights one being taller than the other (Fig. 3).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the Kishimoto LCD panel with that of Murouchi having column spacers with two different heights in order to reduce the problems due to the width changes identified in the prior art discussion (col. 1, lines 11-67) and provides a rigid liquid crystal display cell with superior productivity and durability (col. 2, lines 13-15).

5. Claims 3-5,12,14 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kishimoto and Murouchi as applied to claims1 and10 above, and further in view of Mashiko et al. (Mashiko) (U.S.Patent No. 6,288,766).

Kishimoto discloses additional column spacers (108) formed outside said plural pixels. Murouchi also discloses a sealing layer formed between the pixels and a peripheral area (Col. 5, line 7).

Although Kishimoto discloses a process of fabricating the panel, Kishimoto does not disclose a reservoir, a pressure adjusting means nor evacuation of the liquid crystal.

However, Mashiko in disclosing a liquid crystal display device discloses a method of manufacture and a method for injecting the liquid crystal material, pressure adjusting means (Col. 10, line 19) and the alignment and sealing of the two substrates. Mashiko also discloses a reservoir (62) (Col. 1, lines 26-38) and the pressure being from vacuum to .01 and 1-50 torr (Col. 11, lines 57-60) that is less than the atmospheric pressure as recited in claim 14. When1 atmospheric pressure being equal to 110,000 N/m2 and also equals to approximately 760 torr (the applicant is requested to refer to any text book in Physics for these conversion factors), it would have been obvious to one having an ordinary skill in the art to convert the above units to come up with the recited features of 0/01 N/m2 to 6KN/m2 as recited in claims 16 and 17. Since the cell is still being assembled when the pressure is being applied, there is no electrical power and the room temperature operation is disclosed in abstract and elsewhere.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the method of fabricating the device as disclosed by Mashiko to the display device of Kishimoto and Murouchi to inject the liquid crystal material into the cell in a short time without deforming or damaging the cell while eliminating an occurrence of unwanted deficient injection of the liquid crystal, bubbles and cavitation (Col.3, lines 43-47 of Mashiko).

6. Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kishimoto and Murouchi as applied to claim 2 above, and further in view of Ishikawa et al. (Ishikawa) (U.S.Patent No. 6,414,733).

Kishimoto discloses common electrode (34), Kishimoto does not explicitly disclose switching elements and the connection of these switching elements to the pixel electrodes. Ishikawa on the other hand, in disclosing a liquid crystal display device not only discloses column spacers, switching elements TFT (23), pixel electrodes but also discloses the use of common electrode (22) on one of the substrates. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the switching elements, common electrode as disclosed ed by Ishikawa to the LCD disclosed by Kishimoto to enhance the display efficiency and contrast ratio.

7. Claims 7-9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kishimoto and Ishikawa as applied to claims 6 and Kishimoto and Murouchi as applied to claim 12 above, and further in view of Ogura et al. (Ogura) (U.S.Patent No. 5,739,888).

Kishimoto and Ishikawa disclose column spacers but not spherical spacers or reinforcement spacers in the sealing layer or the specific relationship between the diameter of the spacer to the thicknesses of the various films.

Ogura discloses a sealing layer (28) spacers (30) and the relationship of the diameter of the spacer to the thicknesses of various films (Col. 6, line 50-65

and col. 9, lines 35-54). Ogura also discloses that the particle diameter of the spacers (11)

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the specified thickness relationship as disclosed by Ogura to the display device as recited in instant claims so as to provide a display element which is free from irregularities in luminance in its effective display area and has uniform display quality (Col. 3, lines 32-34 of Ogura).

Response to Arguments

8. Applicant's arguments with respect to claims 1 and 15 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prasad R Akkapeddi whose telephone number is 571-272-2285. The examiner can normally be reached on 7:00AM to 5:30PM M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on 571-272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Prasad R Akkapeddi, Ph.D
Examiner
Art Unit 2871

PRA

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